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WHAT IS CLAIMED IS:

1. A monitoring apparatus comprising:

a gas sampling unit for sampling flue gas or atmospheric air;

an ion source for ionizing components present in very small amounts in said flue gas or atmospheric air under atmospheric pressure or a pressure based thereon;

a mass analyzing unit, provided in a region evacuated to a pressure lower than atmospheric, for mass analysis of ions generated by said ion source and measuring their ion current signals; and

a data processor for processing the measured signals;

wherein at least one of dioxins, chlorobenzenes and chlorophenols in said flue gas or atmospheric air is monitored.

2. A monitoring apparatus according to claim 1, wherein said ion source is an atmospheric pressure chemical ion source operating in a negative ion mode.

3. A monitoring apparatus according to claim 2, wherein said analyzing part is an ion trap mass analyzing part.

4. A monitoring apparatus according to claim 3, wherein said monitoring is performed by integrating ion currents derived from isomers of dioxins, chlorobenzenes or chlorophenols.

5. A monitering apparatus according to claim 4, wherein said monitored ion species of dioxins, chlorobenzenes or chlorophenols comprises ions based on stable isotopes of the

chlorine atom.

6. A monitoring apparatus according to claim 3, wherein said monitored ion species are ions wherein a chlorine atom has been removed from M^-, (M-Cl+O) or orthoquinone ions in the case of dioxins, M^- or $(M-Cl)^-$ in the case of chlorobenzenes, and M^- or $(M-H)^-$ in the case of chlorophenols.

7. A monitoring apparatus comprising:

a gas sampling system for sampling flue gas or atmospheric air;

an ion source for ionizing component present in very small amounts in said flue gas or atmospheric air under atmospheric pressure or a pressure based thereon;

a mass analyzing part, provided in a region evacuated to a pressure lower than atmospheric, for mass analysis of ions generated by said ion source and measuring their ion current signals; and

a data processor for processing measured signals;

wherein at least one organic or inorganic compound containing at least one element from Group VI or Group VII of the periodic table such as oxygen, sulfur or halogen in the molecule of said component, is monitored.

8. A monitoring apparatus according to claim 7, wherein said organic compound is at least one of dioxins, chlorobenzenes or chlorophenols.

9. A monitoring apparatus according to claim 8, wherein

said inorganic compound is at least one of nitrogen oxides (NO_x), sulfur oxides (SO_x), hydrogen chloride (HCl), chlorine (Cl_2) or oxygen (O_2).

10. A monitoring apparatus according to claim 9, wherein the measurement of said inorganic compound and the measurement of said organic compound are performed separately on a time sharing basis.

11. An incinerator, wherein a sample gas is directly introduced to an atmospheric pressure ion source via a pipe, and at least one component of dioxins, chlorobenzenes or chlorophenols is monitored by ionizing components present in very small amounts in said sample gas and performing mass analysis.

12. A method of monitoring chemical substances comprising the steps of:

sampling a gas containing hydrocarbons;

separating a sample gas from said gas, a first introducing step for introducing said separated sample gas to an ionizing unit;

ionizing and producing ionized substances by subjecting said introduced sample gas to a discharge, a second introducing step for introducing said ionized substances to an ion trap analyzing part; and

detecting an ion current of predetermined ionized substances.

13. A method of monitoring chemical substances comprising the steps of:

sampling a gas containing hydrocarbons;

separating a sample gas from said gas, a first introducing step for introducing said separated sample gas to an ionizing unit;

ionizing and producing ionized substances by subjecting said introduced sample gas to a discharge, a second introducing step for introducing said ionized substances to an ion trap analyzing part; and

detecting a mass of predetermined ionized substances.

14. A method of monitoring chemical substances according to Claim 12 or 13, wherein an ion trap mass spectrometer is used as said ion trap analyzing part.

15. A method of monitoring chemical substances comprising the steps of:

sampling a gas comprising hydrocarbons;

separating a sample gas from said gas, a first introducing step for introducing said separated sample gas to an ionizing unit;

ionizing and producing ionized substances by subjecting said introduced sample gas to a discharge, a second introducing step for introducing said ionized substances to an ion trap mass analyzing part;

producing ion substances wherein an atom is removed

from the ionized substances introduced in said second introducing step; and

detecting an ion current of said ion substances.

16. A method of monitoring chemical substances comprising the steps of:

sampling a gas comprising hydrocarbons;

separating a sample gas from said gas, a first introducing step for introducing said separated sample gas to an ionizing unit;

ionizing and producing ionized substances by subjecting said introduced sample gas to a discharge, a second introducing step for introducing said ionized substances to an ion trap mass analyzing part;

producing ion substances wherein either an atom or molecule has been removed from the ionized substances introduced in said second introducing step; and

detecting an ion mass of said ion substances.

17. A method of monitoring chemical substances comprising the steps of:

producing ion substances wherein a hydrogen atom has been removed from dioxin precursors in flue gas;

introducing said ion substances to an ion trap mass spectrometer;

producing negative ions wherein a chlorine atom of the dioxin precursors is selectively removed from said ionized

substances; and

measuring an amount of the negative ions produced.

18. A monitoring apparatus comprising:

a sampling pipe having a sampling port for sampling a gas;

a first filter for removing impurities from said sampled gas;

an ionizer for ionizing sample gas which has passed through said filter by a discharge;

a second filter for removing microparticles from ionized substances;

a mass spectrometer which dissociates a chlorine atom from the ionized substances which have passed through said second filter; and

an ion/charge converter for measuring the current of the remaining ions.

19. An incinerator comprising:

a garbage hopper;

a furnace for burning said garbage;

a gas supply nozzle for supplying gas to the interior of said furnace;

a boiler for recovering heat from said incinerator;

a flue for discharging flue gas which has passed through said boiler;

a sampling port for sampling flue gas from either or

both of said gas supply nozzle or said boiler;

an ion source for ionizing gas from said sampling port by a discharge;

a measuring device for measuring a predetermined target substance contained in said flue gas from the ionized substance from said ion source; and

a controller for controlling the temperature of said incinerator by the measured results.

20. An incinerator comprising:

a garbage hopper;

a furnace for burning said garbage;

a gas supply nozzle for supplying gas to the interior of said furnace;

a boiler for recovering heat from said incinerator and a flue for discharging flue gas which has passed through said boiler;

a sampling port for sampling flue gas from either or both of said gas supply nozzle or said boiler;

an ion source for ionizing gas from said sampling port by a discharge;

a measuring apparatus for measuring a predetermined target substance contained in said flue gas from the ionized substance from said ion source; and

a display device for displaying flue gas sampling points of said incinerator, displaying measured results at said

sampling points, and outputting an alarm when said results exceed predetermined values.